Mercury (II) Thiocyanate

Posted by Anonymous on Wed, 2015-05-06 08:18

Mercury II Thiocyanate: Hi all. Does anyone know if we can use this in high schools? it is used to make Pharoah's serpent?

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Year Level:
9
Laboratory Technicians:
Laboratory Technicians

Showing 1-1 of 1 Responses

Mercury 11 Thiocyanate

Submitted by on 18 May 2015

Answer reviewed 22 February 2023

The Pharaoh or black snake reaction is a highly dangerous chemical reaction that involves the decomposition of mercury (II) thiocyanate, a toxic substance, that is considered too hazardous to be used in schools. The decomposition produces many extremely hazardous substances.

THIS REACTION SHOULD NEVER BE CARRIED OUT IN A SCHOOL.

Science ASSIST has produced a Recommended List of Chemicals [1] for all schools in Australia. Mercury salts, which include mercury (ll) thiocyanate, are considered too hazardous for use in schools and are excluded from this list. Science ASSIST **strongly**

advises against the purchase of any mercury salts and to dispose of any that may currently be held by the school, using a licensed waste disposal contractor.

Safety Data Sheets (SDSs) are the best general source of information available for any chemical and should be consulted as a first step in assessing the risk associated with the use and disposal of a chemical. Science ASSIST has developed a Risk Assessment Template [2] for schools which can be used for this procedure.

Background information

Mercury (II) thiocyanate is a highly toxic chemical and dangerous to the environment. It is fatal if inhaled, swallowed or absorbed through the skin, causes digestive and respiratory tract irritation, may impair fertility and can also cause kidney damage.[3] The decomposition of mercury (II) thiocyanate yields: carbon nitride, mercury vapours, carbon dioxide and sulfur dioxide. Carbon nitride further decomposes into dicyan (cyanogen) gas. Mercury vapours, sulfur dioxide and dicyan gases are all highly toxic and classified as hazardous.

All aspects of this reaction are **HAZARDOUS**:

- Handling the reagents
- Breathing the smoke
- Touching the ash column
- Contact with the remains of the reaction during clean-up

Alternative

Dehydration of sucrose using concentrated sulfuric acid. This reaction should be carried out as a demonstration in the fume cupboard and relevant PPE should be worn when handling the acid.[4]

References

[1] Science ASSIST. (2021, March) *'List of recommended chemicals for science in Australian schools'* Retrieved from the Science ASSIST website: https://assist.asta.edu.au/resource/4669/list-recommended-chemicals-science-australian-schools-2021

[2] Science ASSIST. (2014, July) *'Risk assessment template'* Retrieved from the Science ASSIST website: https://assist.asta.edu.au/resource/2298/risk-assessment-template

[3] Merck Millipore website (2022) *'Safety data sheet for mercury (ll) thiocyanate',* Search https://www.sigmaaldrich.com/AU/en?mmredirect=true to source the latest Safety Data Sheet via the product information page.

[4] YouTube website Beardedscienceguy (2016, October 24), '*Sugar and Sulfuric Acid Dehydration Reaction Experiment*' https://youtu.be/BXZ8M2qHi0g

Australian Government, Department of Environment National Pollutant Inventory, '*Sulfur dioxide (SO_2) National Pollutant fact sheet*

’ Retrieved (22 February 2023) from the Department of Climate Change, Energy, the Environment and Water website: https://www.dcceew.gov.au/environment/protection/npi/resource/student/sulfur-dioxide-0

World Health Organisation website, (2017, March 31), *‘Mercury and health’, Fact sheet No361’* Retrieved from the World Health Organisation website: www.who.int/mediacentre/factsheets/fs361/en/

YouTube website, NileRed (2016, June 14), ‘*Making the Pharoah’s serpent’,* https://youtu.be/vQdK7gaZS0k

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